

REMARKS

In view of the above amendments and the following remarks, reconsideration of the rejections contained in the Office Action of July 22, 2008 is respectfully requested.

By this Amendment, claims 1, 2, 6-8, 10 and 11 have been amended. Thus, claims 1-13 are currently pending in the application. No new matter has been added by these amendments.

On pages 2-3 of the Office Action, the Examiner rejected claims 1-2, 6-8, 10-11 and 14 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner notes that claims 1 and 6 recite “a thin plate-shaped resistive heating element sandwiched and covered by a pair of metal plates” and “a portion of the metal plates extending to an outside of the semiconductor manufacturing device.” In this regard, the Examiner indicates that the metal plates correspond to reference numbers 51a and 51b in Fig. 5, and asserts that members 51a and 51b do not extend to the outside. Rather, the Examiner notes that the flange 52 extends to the outside.

It is noted that independent claims 1 and 6 have been amended to recite a heating main body having a thin plate-shaped outer shell and a thin plate-shaped inner shell, and an attaching portion formed into a flange shape or a pipe shape integrally with the heating main body so as to extend and open to an outside of the semiconductor manufacturing device.

In this regard, it is noted that page 19 of the original specification discloses a heating main body 51 formed of an inner shell 51a and an outer shell 51b, and an attaching portion 52 formed of a flange 52a joined to the inner shell 51a and a flange 52b joined to the outer shell 52b. Further, page 18 of the original specification discloses that the attaching portion 52 is formed integrally with the upper end of the heating main body (*i.e.*, flange 52a is formed integrally with inner shell 51a, and flange 52b is formed integrally with outer shell 51b), and page 19 of the original specification discloses that the attaching portion extends and opens to the outside of the semiconductor manufacturing device. Accordingly, it is respectfully submitted that these features of claims 1 and 6 are described in the original specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention.

Further, the Examiner notes that claim 6 recites that the metal plates are “arranged so as

to detachably cover the inner wall face.” In this regard, the Examiner asserts that the specification does not disclose that the metal plates are detachable. Rather, the Examiner asserts that the specification only discloses that the whole heating unit is disclosed as being detachable. In this regard, it is noted that, without acquiescing to the Examiner’s assertion that the specification does not disclose detachable metal plates, the limitations regarding the metal plates being detachable has been deleted from claims 1 and 6. Rather, claims 1 and 6 have been amended to recite a heating unit being formed so as to detachably cover and heat the inner wall face, which the Examiner acknowledges is supported by the original specification.

Therefore, it is respectfully submitted that claims 1 and 6 clearly comply with the written description requirement of § 112, first paragraph. Accordingly, it is respectfully submitted that the Examiner’s rejections under § 112, first paragraph, are not applicable to amended claims 1 and 6.

On pages 3-8 of the Office Action, the Examiner rejected claims 1-2, 6-7 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy et al. (US 2001/0054381) in view of Nakamura et al. (US 4,346,285) and Myers et al. (US 4,980,557). On pages 8-9 of the Office Action, the Examiner rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy in view of Nakamura and Myers, and further in view of Steger et al. (US 5,788,799). Further, on pages 9-10 of the Office Action, the Examiner rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy in view of Nakamura and Myers, and further in view of Iwabuchi (U.S. 5,755,255). Further, on pages 11-12 of the Office Action, the Examiner rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Umotoy in view of Nakamura and Myers, and further in view of Ohmi et al. (U.S. 2003/0007917). For the reasons discussed below, it is respectfully submitted that the amended claims are clearly patentable over the prior art of record.

Amended independent claim 1 recites a semiconductor manufacturing device comprising a processing chamber, a supply passage for supplying a processing gas to an inside of the processing chamber, a transferring passage through which a wafer is to be put into and taken out of the processing chamber, and an exhaust passage through which the processing gas inside the processing chamber is to be exhausted. Further, the device of claim 1 includes a heating unit

formed so as to detachably cover and heat an inner wall face of at least one of the supply passage, the transferring passage, the processing chamber, and the exhaust passage. Claim 1 also recites that the heating unit includes a heating main body to be disposed adjacent to the inner wall face, and *an attaching portion formed into a flange shape or a pipe shape integrally with the heating main body so as to extend and open to an outside of the semiconductor manufacturing device.*

Further, claim 1 recites that the heating main body includes *a thin plate-shaped outer shell and a thin plate-shaped inner shell that are formed along the inner wall face, a thin plate-shaped resistive heating element sandwiched between and covered by the outer shell and the inner shell so as to have a shape substantially identical so that of the outer shell and the inner shell, and a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas.*

Amended independent claim 6 recites a heating unit for heating, in a semiconductor manufacturing device, an inner wall face of at least one of a processing chamber, a transferring passage through which a wafer is to be put into and taken out of the processing chamber, and an exhaust passage through which a processing gas inside the processing chamber is to be exhausted, with the heating unit being formed so as to detachably cover and heat the inner wall face. The heating unit of claim 6 includes a heating main body to be disposed adjacent to the inner wall face, and *an attaching portion formed into a flange shape or a pipe shape integrally with the heating main body so as to extend and open to an outside of the semiconductor manufacturing device.*

Further, claim 6 recites that the heating main body includes *a thin plate-shaped outer shell and a thin plate-shaped inner shell that are formed along the inner wall face, a thin plate-shaped resistive heating element sandwiched between and covered by the outer shell and the inner shell so as to have a shape substantially identical so that of the outer shell and the inner shell, and a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas.*

Umotoy discloses a chemical vapor deposition chamber which, as shown in Fig. 2a, includes a chamber body 250 having an inside heated liner 200. The heated liner 200 includes an embedded resistive heater 215 within the liner 200. However, Umotoy does not disclose a

heating main body which includes (1) *a thin plate-shaped outer shell and a thin plate-shaped inner shell that are formed along the inner wall face*, (2) *a thin plate-shaped resistive heating element sandwiched between and covered by the outer shell and the inner shell so as to have a shape substantially identical so that of the outer shell and the inner shell*, and (3) *a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas*, as required by independent claims 1 and 6. In addition, Umotoy does not disclose *an attaching portion formed into a flange shape or a pipe shape integrally with the heating main body so as to extend and open to an outside of the semiconductor manufacturing device*.

Nakamura discloses a heat generating unit 104 which, as shown in Fig. 5, includes a rectangular plate 104a made of a material having a positive temperature coefficient characteristic, and first and second electrodes 104b and 104c deposited on opposite flat surfaces of the plate 104a. Therefore, on page 6 of the Office Action, the Examiner states that it would have been obvious to one of ordinary skill in the art “to have adopted a heater made of thin plate-shaped resistive heating element sandwiched by a pair of metal electrodes, as taught by ‘285, to replace the embedded heater #215 in the apparatus in Fig. 2a of ‘381” (emphasis added).

In this regard, it is first noted that the proposed combination as set forth by the Examiner in the Office Action of July 22, 2008 is the device of Umotoy in which the heater 215 is replaced with the heat generating unit 104 of Nakamura, as indicated by the Examiner on page 6 of the Office Action. In such a combination, however, the heat generating unit 104 of Nakamura would be embedded within the liner 200, and therefore no region of the electrodes 104b and 104c of the heat generating unit 104 would be exposed to the processing gas. Thus, the proposed combination of Nakamura and Umotoy would not result in a heating unit which includes a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas, as required by independent claims 1 and 6.

However, on pages 3-4 of the Advisory Action of November 28, 2008, the Examiner appears to propose that the devices of Umotoy and Nakamura could be combined by replacing the liner 200 of Umotoy with the metal plates (electrodes 104b and 104c) of Nakamura such that

the heater 215 of Umotoy becomes sandwiched between the metal plates. In such a combination, the Examiner notes that the portions of the metal plates above the heater 215 in Fig. 2a of Umotoy would be exposed to the processing gas.

In this regard, however, it is noted that it would not have been obvious to one of ordinary skill in the art to replace the liner 200 of Umotoy with the metal plates (electrodes 104b and 104c) of Nakamura, because such a combination would render the device of Umotoy unsatisfactory for its intended purpose. In particular, Umotoy discloses that the heater 215, a cover plate 207, and a feedthrough portion 214 for an AC voltage are all arranged within the liner 200 (see paragraph [0034]). Further, Umotoy discloses that the liner 200 is isolated from the chamber body 250 by dowel pins 220 which are press-fit into receiving holes 224 in the bottom of the liner (see paragraph [0036]), and that the liner 200 entirely supports an edge ring 550 (see paragraph [0057]). In this regard, it is noted that replacing the liner 200 of Umotoy with the electrodes 104b and 104c of Nakamura so as to sandwich the heater 215 would render the device of Umotoy unsatisfactory for its intended purpose because such a combination would result in the cover plate 207 and the feedthrough portion 214 being exposed, and would fail to provide an adequate structure capable of entirely supporting the edge ring 550 as well as engaging with the dowel pins 220 on the bottom of the liner to remain isolated from the chamber body 250.

Therefore, as the proposed substitution of the electrodes 104b and 104c of Nakamura for the liner 200 of Umotoy would require substantially redesigning the device of Umotoy in order for the device of Umotoy to remain satisfactory for its intended purpose, it appears that the Examiner's proposed combination is based on impermissible hindsight, as one of ordinary skill in the art would clearly not have replaced the liner 200 of Umotoy with the electrodes of Nakamura based on the teachings of the prior art.

Further, Nakamura, like Umotoy, also does not disclose *a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas*, as required by independent claims 1 and 6.

Myers discloses a sensor which, as shown in Fig. 1a, includes a heater wire 21 threaded through bores of a ceramic piece 22. Further, Myers discloses that end-loops of the heater wire 21 are protected by a ceramic sealant 23. Thus, on page 4 of the Advisory Action, the Examiner

concludes that it would have been obvious to one of ordinary skill in the art to replace the liner 200 of Umotoy with the electrodes 104b and 104c of Nakamura so as to sandwich the heater 215, and to use the ceramic sealant 23 of Myers to seal the ends of the electrodes 104b and 104c of Nakamura above the heater 215 so as to arrive at the invention of independent claims 1 and 6.

However, as indicated above, it is noted that it would not have been obvious to one of ordinary skill in the art to replace the liner 200 of Umotoy with the metal plates (electrodes 104b and 104c) of Nakamura, because such a combination would render the device of Umotoy unsatisfactory for its intended purposed without at least substantially redesigning the invention of Umotoy. In this regard, it is noted that Myers only discloses a sensor in which end-loops of the heater wire 21 are protected by a ceramic sealant 23, and therefore the combination of Umotoy, Nakamura and Myers does not disclose or even remotely suggest a heating unit which includes a heating main body to be disposed adjacent to the inner wall face, and an attaching portion formed into a flange shape or a pipe shape integrally with the heating main body so as to extend and open to an outside of the semiconductor manufacturing device, and in which the heating main body includes a thin plate-shaped outer shell and a thin plate-shaped inner shell that are formed along the inner wall face, a thin plate-shaped resistive heating element sandwiched between and covered by the outer shell and the inner shell so as to have a shape substantially identical so that of the outer shell and the inner shell, and a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas, as required by independent claims 1 and 6.

Therefore, for the reasons presented above, it is believed apparent that the present invention as recited in independent claims 1 and 6 is not disclosed or suggested by the Umotoy reference, the Nakamura reference and the Myers reference taken either individually or in combination. Accordingly, a person having ordinary skill in the art would clearly not have modified the Umotoy reference in view of the Nakamura reference and the Myers reference in such a manner as to result in or otherwise render obvious the present invention of independent claims 1 and 6. It is also noted that the additional references cited by the Examiner do not cure the defects of the Umotoy, Nakamura and Myers references discussed above with respect to independent claims 1 and 6.

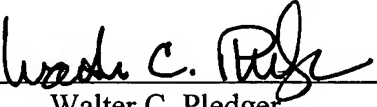
Therefore, it is respectfully submitted that independent claims 1 and 6, as well as claims 2-5 and 7-13 which depend therefrom, are clearly allowable over the prior art of record.

In view of the foregoing amendments remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice to that effect is respectfully solicited.

If, after reviewing this response, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

Mitsuaki KOMINO et al.

By: 

Walter C. Pledger

Registration No. 55,540

Attorney for Applicants

WCP/lkd
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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